National Aeronautics and Space Administration

NASA's Impact in Vermont: A Tech Transfer Perspective

You know that NASA studies our planet, our sun, the solar system, and the Universe.
But did you know about the space program's economic impact here on Earth?

In 2011, NASA invested over **$2 million** in the state of Vermont.

Since 2001, NASA's SBIR/STTR Program has invested nearly
$3 million in **Vermont**
and more than **$1.2 billion** nationwide.

How NASA's SBIR/STTR Program Benefits Vermont

NASA is committed to moving technologies and innovations into the mainstream of the U.S. economy, and the Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) program helps fulfill this goal.

SBIR/STTR stimulates technological innovation by encouraging small, high-tech companies—particularly minority and disadvantaged businesses—to partner with NASA to help meet its research and development needs in key technology areas. At the same time, this program strengthens small companies by enabling them to bring cutting-edge new products into the U.S. economy.

The list to the right highlights Vermont businesses that received SBIR/STTR contracts from NASA since 2001. **(Visit http://sbir.nasa.gov for more information on the SBIR/STTR program.)**

NASA SBIR/STTR Companies in Vermont

Concepts ETI, Inc. .....White River Junction
Seldon Technologies .....Windsor

vermont

How NASA Spinoffs Benefit Vermont

Portable Kit Creates Safer Drinking Water *(Windsor)*
To facilitate efficient and safe long-term space travel, NASA seeks to improve the process of filtering and re-using wastewater in closed-loop systems. Because it would be impractical for astronauts to bring months worth of water on missions, reducing the weight and space taken by water storage through recycling and filtering is crucial. NASA's research into providing clean drinking water for astronauts has yielded new water filtration products on Earth.

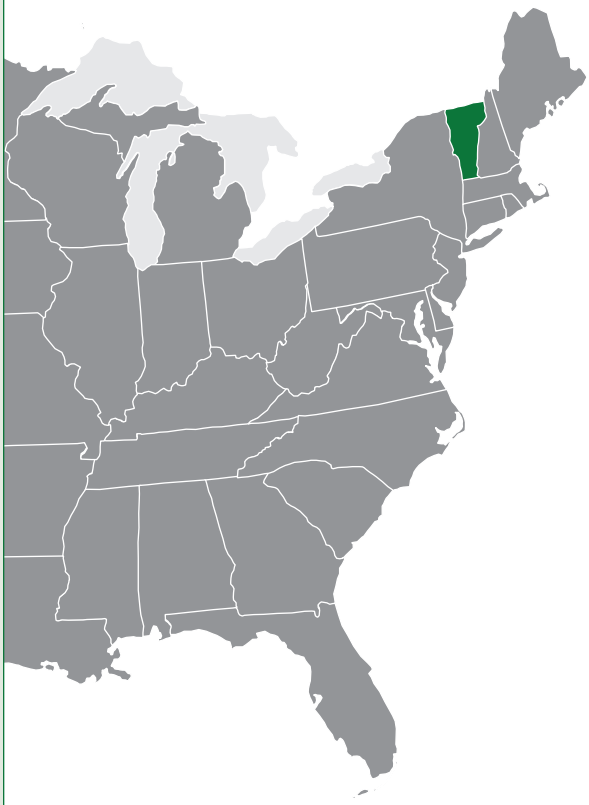
An SBIR contract enabled Seldon Laboratories, LLC (now Seldon Technologies) to create a lightweight water purifier that relies on carbon nanotubes and mesh to quickly remove microorganisms such as bacteria, viruses, endotoxins, and chemical contaminants from water. It requires no electricity, heat, or chemical additives. The portable purifier can be carried in a backpack for hiking, backpacking, cycling, field work, camping, or international travel. The company's more robust water kit can support the needs of a small village and was recently used to purify drinking water in Rwanda.

Easier Analysis With Rocket Science
(White River Junction)
NASA's Generalized Fluid System Simulation Program (GFSSP), originally developed to predict axial thrust in a turbopump, has since been modified to work as modular, general purpose code for analyzing steady state and transient flow distribution in complex flow networks. The program has enabled engineers to save time and avoid the costs associated with writing code from scratch, make better design decisions earlier, and decrease the number of tests required while improving test quality.

In 2001, Concepts NREC licensed GFSSP, making it an integral part of the company's software for designing and analyzing turbine blades. The product offers the unique ability to provide an accurate model of the company's turbine blades and flow networks, including flow rates, fluid properties, and contributions of the flow network that impact the blade's temperature. The software has become a successful product for NREC, with sales to major turbomachinery designers and manufacturers in the aerospace industry.

Aircraft Icing Sensor Increases Flight Safety
(Vergennes)
As planes pass through clouds, they can come into contact with supercooled water droplets which freeze onto unprotected surfaces of the aircraft during flight. The buildup of ice changes the shape of the aerodynamic surfaces, which can alter the flow of air around critical components, particularly wings and engine inlets. The resulting ice accretion can dramatically reduce aircraft performance and control and constitutes a significant flight hazard. Aircraft are equipped with various devices to remove ice from critical components but the pilot must be made aware of ice accretion.

NASA partnered with the Massachusetts Institute of Technology (MIT) to pioneer a system that alerts pilots to the fact that ice is building up on an aircraft. Simmonds Precision Products, Inc. incorporated this technology into its highly accurate, reliable ice detection system. The system warns pilots of hazardous icing conditions, increasing flight safety for pilots and passengers.



NASA actively seeks partnerships with U.S. companies that can license NASA innovations and create "spinoffs" in areas such as health and medicine, consumer goods, transportation, renewable energy, and manufacturing. When businesses leverage NASA technologies to develop new products, it not only benefits the regional economy, but significantly strengthens the nation's competitiveness in the global marketplace.

NASA's centers across the country have helped 7 Vermont companies develop revolutionary spinoff technologies.

Learn more about how NASA innovations benefit the public in *Spinoff*, an annual publication that highlights NASA's most significant technology transfer successes.
(Available at: http://www.sti.nasa.gov/tto)

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